

Stereophotogrammetric assessment of the smiling capability after facial reanimation surgery

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Facial palsy causes functional and aesthetic problems; among those, the reduction of facial mimicry and smiling difficulties, require surgical treatment and rehabilitative procedures [1]. To quantitatively evaluate the recovery of the smiling capabilities after reanimation surgery (double cross-face, masseteric-facial nerve neurotomy, hypoglossus-facial nerve neurotomy), 11 patients (4 females, 7 males, mean age 59.6, SD 10.4 years) affected by acute unilateral facial palsy were acquired with a 3D stereophotogrammetric instrument. Each patient was acquired in neutral facial position and performing 4 different types of smile, executed taking advantage of the aforementioned surgical stimuli, both separately and together. The smiling facial images were divided in two hemifaces, successively registered on the corresponding neutral one. Root Mean Square (RMS) distances between neutral face and smiling hemifaces were automatically calculated by the software of the stereophotogrammetric system. Inter and intra-operator repeatability in performing this procedure were assessed. A two-way ANOVA for repeated measurements was performed in order to verify the differences among the smiles and the facial sides. Results showed good intra and inter operator repeatability of the procedures (R^2 0.6 and 0.9, respectively). Statistical significant differences were found among the different smiles and the facial sides ($p < 0.01$ in both cases) and for the side \times smile interaction ($p < 0.05$). For the affected facial side, post hoc tests revealed statistical significant differences ($p < 0.05$) between the smiles performed using the double cross-face (mean RMS 0.5 ± 0.2 mm) and masseteric-facial nerve neurotomy, with this last being more powerful (RMS 0.9 ± 0.5 mm). The results offer the possibility to objectively quantify the recovery of the smiling capability, usually qualitatively evaluated, through subjective grading systems.

References

- [1] Biglioli F et al. (2017) Masseteric-facial nerve neurotomy: results of a case series. *J Neurosurg* 126:312-318.

Keywords

Facial palsy, stereophotogrammetry, smile, Root Mean Square